

Recommended Best Waste Management Practices for Electronics Waste Recycling Businesses

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What is Electronic Waste and Why is It a Concern?

Electronics are products that have their primary functions provided by electronics circuitry and components. Common examples include computers, monitors, printers, scanners, data storage devices, servers, networking systems, copiers, fax machines, radios, TVs, cell phones and pagers.

Electronics that can't be upgraded or repaired for re-use are referred to as **e-waste**. E-waste often contains toxic and hazardous components that may pose threats to human health and the environment if disposed of improperly. Certain components, such as cathode ray tubes (CRTs) found in computer monitors and television sets, circuit boards, cell phone and circuit board batteries, and mercury containing devices are a few of the many components that may require the waste to be recycled and handled in a certain way, rather than be disposed with regular garbage.

What is the Purpose of this Document?

This document recommends best waste management practices for businesses and institutions that generate, transport, collect and consolidate e-waste, such as persons collecting e-waste from businesses or consumers for recycling or disposal, or repair shops that break down electronics into individual components for further recycling or disposal. These management practices are based on the premise that all waste management practices should prevent releases of contaminants to the environment and protect human health.

A Note for Businesses and Institutions Generating E-Waste:

E-waste has the potential to be hazardous. Businesses and institutions generating e-waste are prohibited from disposing of hazardous e-waste in the garbage.

Because testing the e-waste and/or components to whether they are or are not hazardous is expensive, and since there are a number of regulatory exemptions available for hazardous e-waste that is recycled, it is often simpler and less expensive to recycle it rather than demonstrate that the waste is not hazardous. For these reasons, recycling is recommended.

This document identifies conditions under which an electronics recycling business may not be required to obtain DNR approval or licenses, provided that the recommended management practices outlined in this document are complied with. However, after reading the document, if you are still unsure whether you need licenses or approvals, please contact your regional DNR office prior to conducting business. (Regional County Offices:
www.dnr.state.wi.us/org/aw/wm/contacts/regions.htm)

This document does not explain the specific regulations that apply to individual e-waste components; rather, the recommended management practices ensure that the minimum legal requirements are met. In some cases, the recommended practices provided in this document may go above and beyond the minimum legal requirements for certain types of recycling activities.

The “References” section of this document lists specific regulations and guidelines applicable to specific electronic components. Attachment A is a flow diagram illustrating specific requirements for e-waste components.

Best Management Practices for Persons Managing E-Waste

Transportation. E-waste transportation requirements apply to persons collecting e-waste items and transporting them to a site for consolidation, recycling or disposal. In general, no transportation license is required from DNR to transport e-waste that is destined to be recycled, provided that certain safe handling and management standards are followed. Transportation of waste that is destined to be disposed may require a DNR solid or hazardous waste transportation license. In these cases, please contact your regional DNR office for licensing information.

Recommended transportation practices:

- Comply with all applicable U.S. Department of Transportation regulations, including, but not limited to, packaging, labeling, marking and placarding requirements.
- Clean up and dispose of spill residue promptly and appropriately.
- Transport e-waste to a licensed, approved, or other appropriate facility, such as a legitimate recycling facility, a licensed hazardous waste facility or a universal waste handler.
- Ensure that containers are not damaged during on and off-loading and that waste containers are secure during transport.
- Place broken or processed CRTs in a closed, secure container to minimize dust.
- Label containers of broken or processed CRT glass: “waste cathode ray tubes – contains leaded glass” or “used cathode ray tubes – contains leaded glass” and “do not mix with other glass materials.”

Transporters storing e-waste for more than 10 days should also follow recommended consolidation and storage practices below.

Consolidation and Storage. The following recommended management practices apply to storage of e-waste before de-manufacturing and to the storage of individual components after the e-waste has been broken down. In general, no DNR licenses or approvals are necessary if the management practices listed below are complied with.

Recommended practices:

- Ensure containers are closed, structurally sound and compatible with the contents.
- Label waste to clearly identify the type of waste.
 - o Containers of broken or processed CRT glass should be labeled: “waste cathode ray tubes – contains leaded glass” or “used cathode ray tubes – contains leaded glass” and “do not mix with other glass materials.”
 - o Batteries, lamps and mercury containing devices should be labeled as “used-“, or “waste-“ batteries, lamps, mercury, etc., to clearly identify the type of waste.
- Document the length of time the waste has been accumulated on-site. Persons may store waste for up to one year for the purpose of accumulating quantities necessary to facilitate proper recovery, treatment or disposal.
- Train employees on proper handling and emergency procedures.
- Respond to spills and manage any resulting residues promptly and appropriately.
- Take e-waste to a licensed, approved, or other appropriate facility, such as a legitimate recycling facility, a licensed hazardous waste facility or a universal waste handler. Records demonstrating proper recycling are recommended. Arrangements should be made prior to shipping the waste to another waste management facility.
- Store broken or processed CRTs in a building with a roof, floors, and walls, or in a container that is constructed and handled to minimize dust.

Persons handling 5,000 kg or more of e-waste: There are additional recommended management practices for persons handling more than 5,000 kg or more of e-waste including recordkeeping, additional training and obtaining an [EPA identification number](#). Please contact your regional DNR office for more information regarding applicable requirements prior to consolidating or storing e-wastes of 5,000 kg or more.

Examples of activities that may be exempt from processing requirements and/or licensing are provided below.

CRTs. Persons handling broken or intact CRTs, separating and sorting different types of CRT glass, or cleaning coatings off glass removed from CRTs are exempt from hazardous waste licensing requirements if the following standards are

Speculative accumulation: Many components of e-waste, such as copper wiring, circuit boards and other metals are marketable; however, the value of components may fluctuate. Therefore, it is important to be able to demonstrate that there is a legitimate market and maintain records to prove that the waste is not being “speculatively accumulated”; i.e., stockpiled for potential future use. Accumulating waste on-site for less than a year would demonstrate that the waste is not being speculatively accumulated and reduce potential liability.

followed:

De-manufacturing or Disassembly. De-manufacturing or disassembly means to manually break down e-waste into individual components either for re-sale or re-use or to sort for further recycling. Requirements for collecting and consolidating e-waste (above) often also apply to persons who de-manufacture or disassemble e-waste for the storage of the waste prior to and after disassembly. In general, persons engaged in simple de-manufacturing or disassembly are not required to obtain DNR approvals or licensing.

- All CRTs should be processed within a building with a roof, floor and walls, and no activities may be performed that use temperatures high enough to volatilize lead from CRTs.
- Facilities processing CRTs should keep records for at least 3 years to verify that CRTs are being recycled and to demonstrate that they have not speculatively accumulated CRTs.

Batteries. Persons sorting, mixing, discharging,

It is important to make arrangements with downstream recyclers prior to disassembling e-waste because individual recyclers may require that the waste meets certain specifications.

regenerating, disassembling battery packs into individual batteries or cells, removing batteries from consumer products, and removing electrolyte from wet-cell batteries are exempt from hazardous waste licensing if the casing of each individual battery cell is not breached and remains intact and closed. Battery cells may be opened to remove electrolyte but should be immediately closed after removal.

Metal and Plastic. Persons shredding, sorting, grading, compacting, bailing or processing clean plastics and scrap metal for further recycling are not required to obtain a solid waste processing license.

Processing. Processing activities, other than simple de-manufacturing or disassembly of e-waste components, that change the chemical or physical make up of a hazardous electronic component, may be considered “treatment” of hazardous waste. Examples of treatment activities include reclaiming metals from batteries, shredding circuit boards, or reclaiming metals from circuit boards or lead from CRTs. Processing e-waste components may require a DNR license. These requirements are very site and process specific. If you are involved with recycling activities other than simple de-manufacturing or disassembly, you should contact your [regional DNR contact person](#) for more information regarding potential regulations and licensing.

Occupational Safety and Health Administration (OSHA)

respiratory protection standards, 29 CFR 1910.134, may apply, especially if you are dismantling e-waste. For more information, contact OSHA at www.osha.gov or 1-800-321-6742.

In Summary. To encourage recycling, DNR has reduced regulations for persons generating, transporting, and consolidating or storing e-waste that is destined for recycling. However, persons involved with processing e-waste, such as crushing, shredding or reclamation of e-waste components, may be subject to full waste management regulations, including licensing. Applicable requirements are very site and process specific. Persons processing e-waste should contact the DNR for more information.

Reference Material

The following waste-specific references provide detailed, enforceable requirements for individual waste types:

- Waste computer and peripherals. "Managing Used Computers – A Guide for Businesses & Institutions" (WA-420-04)
www.dnr.wi.gov/org/aw/wm/publications/recycle/pwbwa420.pdf
- Cathode ray tubes. "Management of Cathode Ray Tubes in Wisconsin" – July 10, 2003,
www.dnr.wi.gov/org/aw/wm/publications/hazard/managementcrtinwisc.pdf
- Fluorescent bulbs. "Safe Lamp and Bulb Management" (WA-195-03)
www.dnr.state.wi.us/org/aw/wm/publications/hazard/BulbrecyclingWA195-03.pdf
- Batteries. "Standards for Universal Waste Management" – ch. NR 690, Wis. Adm. Code,
www.legis.state.wi.us/rsb/code/nr/nr690.pdf

- Fluorescent bulbs and miscellaneous mercury containing devices. "Management of Wisconsin-Specific Universal Waste" (WA-742-02)
www.dnr.state.wi.us/org/aw/wm/publications/hazard/unvwaste204.pdf

Other Resources:

- EPA – Plug into E-cycling
www.epa.gov/epaoswer/osw/conserved/plugin/index.htm
- National Center for Electronics Recycling
www.electronicrecycling.org
- International Association of Electronics Recyclers
www.iaer.org

Wisconsin DNR Contacts.

- Regional County Offices:
www.dnr.state.wi.us/org/aw/wm/contacts/regional.htm
- Recycling Program Coordinator or Hazardous Waste Program Coordinator 608-266-2111,

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Attachment A

Waste Management Requirements for Electronic Waste



